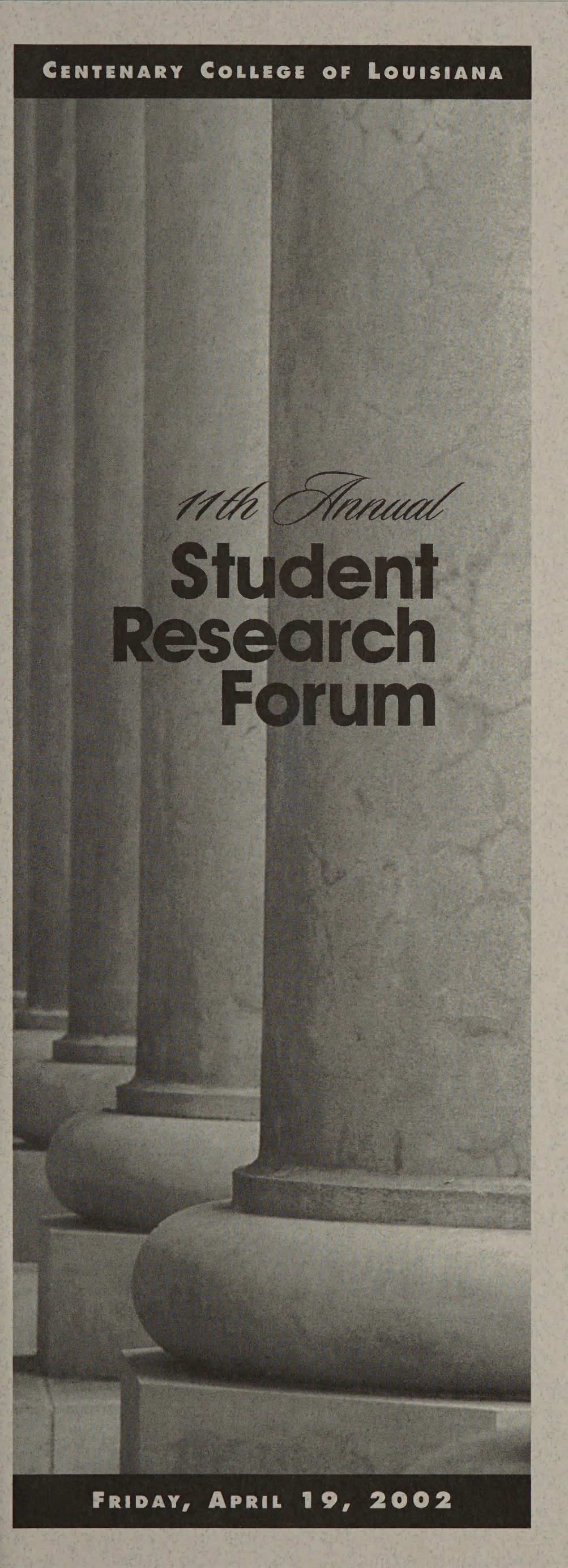


A black and white photograph of several classical columns, likely from a university building, receding into the distance. The columns are made of stone and have papyrus capitals. The lighting creates strong shadows, emphasizing the texture and form of the architecture.

CENTENARY COLLEGE OF LOUISIANA

11th Annual
**Student
Research
Forum**

FRIDAY, APRIL 19, 2002

CENTENARY COLLEGE OF LOUISIANA

11th Annual
**Student
Research
Forum**

**APRIL 19, 2002
MICKLE HALL 114
(CARLILE AUDITORIUM)**

11th Annual **Student Research Forum**

SPONSORED BY

Centenary Book Bazaar and
Provost and Dean of the College

JUDGES

Dr. Susan Brayford
Dr. Jodi Campbell
Dr. Ron Martin

FROM THE DIRECTOR

Thank you participants and advisers for doing the research projects and presenting your work in this forum. This 11th annual forum is the largest and hopefully “the best” one to date.

Thank you judges, Dr. Susan Brayford, Dr. Jodi Campbell and Dr. Ron Martin, for your time and effort on this great event.

A big thank you is given to the Centenary Book Bazaar for its financial support. It is greatly appreciated!

A sincere thanks is also given to the Provost and Dean of the College, Dr. Earl Fleck, for all of his encouragement and support.

Thank you Ms. Jeannie Clements, Office of the Provost, and Ms. Peggy Cooper, Office of Public Relations, for all your work on the brochure, refreshments, etc. You are the best!

Alfred McKinney, Director
11TH ANNUAL STUDENT RESEARCH FORUM

* denotes presenter

RESEARCH POSTERS

Posters (Judging) 12-12:30 pm

Ashlei Baker, Biology
Kathryn L. Furr, Biology
Laura Mims, Biology
Elizabeth Quillen, Physiology
Jana K. Shirey, Biology
Doug Smith, Biology

RESEARCH PAPERS

Social Sciences Division

Katherine Boone Ford White, Sociology .. 1:30 pm
G. B. Cazes, Finance 1:40 pm
Shannon Guzovich, Sociology 1:50 pm
Aimee Miceli, Sociology 2:00 pm
Rebekah Snider, Sociology 2:10 pm
Neha Surie, Economics 2:20 pm
Ariej Abdulhalim, Sociology 2:30 pm

Humanities Division

Lisa Game, English 2:40 pm
Jennifer Gipson, French 2:50 pm
Amanda Schiffner, English 3:00 pm
Stacy Shelton, Art History 3:10 pm
Cassandria Snipe, English 3:20 pm

BREAK 3:30-3:40 pm

Natural Sciences Division

Julie Reisig, Biology 3:40 pm
Kathryn L. Furr, Biology 3:50 pm
Christy Finch, Mathematics 4:00 pm
Davon Ferrara, Physics 4:10 pm
Staci Deaton, Biochemistry 4:20 pm
Thomas H. Louis, Chemistry 4:30 pm
Aimee Robinson, Biochemistry 4:40 pm

BREAK 4:50-5:00 pm

Leif Sherry, Chemistry 5:00 pm
Benjamin F. Pierce, Chemistry 5:10 pm
Jason Fowler, Biology 5:20 pm
Brant Landry, Biology 5:30 pm
Jeremy Norwood, Biology 5:40 pm
Jeanne Rasbery, Biology 5:50 pm
Margaret Read, Health/Exercise Science .. 6:00 pm

RESEARCH POSTERS

The Effects of an Intense Movie Clip and Sex of the Viewer on Muscle Fatigue

ASHLEI BAKER

CENTENARY COLLEGE OF LOUISIANA
DEPARTMENT OF BIOLOGY

It has been documented that certain stressful situations stimulate muscle activity, thus causing muscles to contract and perform more strongly than under normal conditions. I tested the effects a war scene from a movie would have on the duration and strength of a muscle performing a repetitive act (i.e. pulling on trigger apparatus). Two tests were designed: one with a movie clip of a war scene, and one without the movie clip for each of 10 subjects. In all cases, the movie clip did have an impact on all the subjects. All subjects were able to pull the trigger longer, which indicated an increase in the threshold of their muscle fatigue. Another factor I tested was the sex of the viewer- if the movie clip had more of an impact on one sex or another and the possible reasons as to why this would occur. Comparing the movie data with the no-movie data, the males did have consistently stronger trigger pulls, but the females showed a greater increase in trigger pull time between the two tests.

The Effect of Heartworm Pills on the Metabolism of the American Cockroach

KATHRYN L. FURR

CENTENARY COLLEGE OF LOUISIANA
DEPARTMENT OF BIOLOGY

Heartworm pills are endectocides, used to weaken internal parasites in household pets. Some residues from these endectocides are not retained within the animal's body and are excreted. This has caused concern because endectocidal residues have decreased reproduction and larval development in organisms that breed and/or feed in treated animals' fecal matter. Because the American cockroach (*Periplaneta americana*) is a voracious omnivore, it could feed on the fecal matter of animals that are given endectocides. The effects of endectocides on cockroaches were tested by dissolving three kinds of heartworm pills in water, giv-

ing it to starved cockroaches for a 72 hour period and measuring the effects on carbon dioxide production (metabolism). Carbon dioxide production varied significantly among the three pills ($p=0.006$). Filaribits Plus had the greatest effect on cockroach metabolism with CO_2 production peaking at 1500 minutes after administration. Cockroaches fed Interceptor reached the maximum level of CO_2 production of 5000 ppm at 4100 minutes. Cockroaches fed Sentinel increased CO_2 production 3000 ppm in the 4200 minute testing period. Therefore, Heartworm pills can have an effect on an organism that breeds and/or feeds on fecal matter, leading to detrimental effects on the environment due to coprophagus organisms' importance in nutrient recycling.

Oxygen Consumption of *Pomacea maculata* and *P. bridgesi* in a 0.25% Aqueous Caffeine Solution

LAURA MIMS

CENTENARY COLLEGE OF LOUISIANA
DEPARTMENT OF BIOLOGY

Caffeine is currently being used as an effective ranicide against invasive frogs inhabiting the Hawaiian Islands by increasing the frogs' metabolism to the point of cardiac arrest. Apple snails are also significant exotic pest species of the Hawaiian Islands as well as Asia, Africa, and the Philippines. The purpose of this experiment was to determine if caffeine could effect the metabolism of the snails in such a way as to be a feasible snailicide. The O_2 consumption of 10 apple snails was measured to establish a baseline O_2 consumption under normal lab conditions. Then the water was replaced with a 0.25% aqueous caffeine solution, and the snails' O_2 consumption was measured again. A test for the equality of slopes indicated a significant difference in the O_2 consumption of the snails after the addition of caffeine ($p\text{-value} = 0.019$). The O_2 consumption of the snails increased more rapidly over time when the snails were exposed to caffeine than in normal water. Six of the 9 treated snails died. It may be reasonable to further investigate the physiological effects of caffeine on the snails as well as the cost effectiveness of caffeine use as a possible snailicide.

Mutations in the 3' End of the Firefly Luciferase Coding Region Result in Decreased Activity

ELIZABETH QUILLIN*
SVITLANA MALYARCHUK
JEFFREY HOUGHTON
LYNN HARRISON

LSU HEALTH SCIENCES CENTER
DEPARTMENT OF CELLULAR AND MOLECULAR PHYSIOLOGY

We designed a mutation assay to examine the replication errors introduced opposite specific oxidized base damages, in which a mutation leads to a truncated protein or a single amino acid change. To do this, we have to determine whether specific point mutations alter luciferase activity. The oxidized damage will be inserted at the 3' end of the luciferase coding region. We generated five constructs carrying mutations. Each mutation was introduced by ligating a double-stranded oligonucleotide carrying the mutation into Pac1 and Cla1 restriction enzyme sites. Each ligation reaction was transformed into bacteria, plasmid DNA was isolated and sequenced to confirm the presence of the mutation. To test for the activity, the plasmid was transformed into BW35 cells, an extract was prepared, and tested for luciferase activity. We determined that a single amino acid change of a lysine at position 445 to a glutamate resulted in a 68% decrease in activity. When a translation stop codon was introduced at position 444 or 445, proteins contained 443 and 444 amino acids instead of 550, and luciferase activity was eliminated. Another construct, pGly, was generated that encoded GGT instead of GGG. This change in codon usage resulted in a 45% decrease in activity.

An Analysis of NF2 Mutations: Different CpG Hotspots of Mutation in Adult and Embryonic Germlines

JANA SHIREY*
JONI B. DROST, PH.D.

CENTENARY COLLEGE OF LOUISIANA
DEPARTMENT OF BIOLOGY

Most mutations in the human germline result from normal events. Using global mutation databases, the effect of embryonic mutation resulting in germline mosaicism upon mutation patterns and spectra can be studied in

multiple genes. Human mosaicism is usually identified in blood from the individual in whom the mutation occurred. Among *F9* mutations, about 11% of mutation origins are mosaic. Choosing diseases affecting other germ layers should increase the opportunity to identify mosaicism. For neurofibromatosis, a disease characterized by benign nervous system tumors caused by mutations in the *NF2* gene, half the cases involve new mutations. In the *NF2* database (<http://neuro-trials1.mgh.harvard.edu/nf2/>) we identified 69 cases for which the first affected individual and parents provided blood for DNA analysis. Using all published data and literature regarding these, we distinguished two groups of germline mutation origins, adult and embryonic. Within the sample of 69 mutations, 34 resulted in mosaic individuals. Significantly more CpG transitions occurred ($p=0.0037$, Fisher's Exact) among embryonic mutations (15/34) compared to adult germline mutations (6/35). Spectral analysis CpG mutations indicated the existence of hotspots of CpG transitions overall ($p=0.00005$, Hot Spot Detector) and in the embryo ($p=0.016$, Hotspot Detector) with at least two hotspots specific to the early embryo.

The Effect of Phenylpropanolamine on the Metabolic Rate of *Mus musculus*

DOUG SMITH

CENTENARY COLLEGE OF LOUISIANA
DEPARTMENT OF BIOLOGY

This study focused on the effects of phenylpropanolamine (PPA), an ephedra alkaloid contained in Dexatrim(r), on the metabolic rate of mice. I hypothesized that the use of a drug containing PPA will not have any significant effect on the oxygen consumption of *Mus musculus*, as compared to a control group or to having the mice exercise. The oxygen consumption (in ppt/g) among the three different groups did not vary significantly under the tested conditions ($p = 0.10$, $F_s = 2.74$). The control group had the lowest oxygen consumption and the drug group had the highest oxygen consumption. The change in oxygen consumption among the three different groups did not vary significantly under the tested conditions ($p=0.27$, $F_s=1.48$). The mice in the exercise group ate the most food and drank the most water, followed by the drug group, and then the control group. Because the drug raised the oxygen consumption of the mice in the drug group, although not significantly, the drug might be slightly effective for

human weight loss. However, an individual could achieve similar results with exercise alone.

RESEARCH PAPERS

Blood is Thicker than Wine

KATHERINE BOONE FORD WHITE

CENTENARY COLLEGE OF LOUISIANA
DEPARTMENT OF SOCIOLOGY

This paper argues that family ties, primarily biological ones, help to create a sense of community within a church more than events organized by that church. I examine a Greek Orthodox Church located in the South and its parishioners.

Determinants of Firm Performance in the Casino Gaming Industry

G. B. CAZES

CENTENARY COLLEGE OF LOUISIANA
FROST SCHOOL OF BUSINESS

The casino gaming industry, as a whole, has outperformed the S&P 500 for three of the last four years. The investing public has emphasized the need in the popular press for empirical pieces to identify commonalities among these firms that have contributed to their success. The contribution of the research is to examine the theoretical ingredients of firm performance in an industry that the literature has not studied, to date.

A literature review will summarize determinants of firm performance that have been supported in prior empirical pieces. Using regression analysis, financial reporting and firm performance data from all publicly traded firms within the casino gaming industry will be examined to determine the relationship between the components of firm performance as identified in the literature. Previously identified measures include capital structure, size, earnings, dollars of research and development, percentage of institutional investors and number of prior stock splits.

Exercise and Self-Identification

SHANNON GUZOVICH

CENTENARY COLLEGE OF LOUISIANA
DEPARTMENT OF SOCIOLOGY

The purpose of this study is to examine the relationship between exercise behavior and self-identification as an athlete. Participants included 143 undergraduate students who were observed and surveyed after taking part in various exercise routines. Observations were made and each participant was given a 'score' in the areas of dress, knowledge, grace/athleticism, and warm up/cool down routines. The scores were then compared directly to the participant's own judgement of their ability in these areas. The study also compares self-reported knowledge and importance of exercising to the actual behavior displayed while the participants exercised. Variables examined included happiness, motivation, self-confidence, type of exercise, and socialization while exercising. Conclusions were drawn based upon the combination of the participant's behavior during exercise and their survey answers regarding their exercise routine.

The Greeks that Drink - A Study of the Role of Alcohol in the Greek System.

AIMEE MICELI

CENTENARY COLLEGE OF LOUISIANA
DEPARTMENT OF SOCIOLOGY

The drinking patterns of college students is a subject that has been widely researched for many years. One group whose habits have been studied closely are the students involved in the Greek system. To better understand why drinking is so prevalent in the Greek system a study was conducted. A survey was conducted on members of the Greek community at a small liberal arts college in the South. During their weekly meetings, members were asked to fill out a 20-question survey that asked them about their drinking habits, activity level in the group, and the drinking habits of their friends. Focus groups were also conducted to further understand the links between drinking and the Greek system. Early analysis of the data indicates that several links may exist. Age, activity level, length of membership, leadership in the group, and the drinking habits of their friends all seem to be linked to heavy drinking. Whether or not the relationships between these variables and drinking levels are positive or negative is yet to

be seen. Further, statically analysis must be conducted to determine whether these variables have an affect on how much Greek students drink.

My data analysis will be completed before the research forum but is not finished at this time. I am unable to include my final findings in this abstract.

The Dave Matthews Band Fan Club: Empathic Solidarity or Just Plain Crazy?

REBEKAH SNIDER

CENTENARY COLLEGE OF LOUISIANA
DEPARTMENT OF SOCIOLOGY

Members of the Dave Matthews band fan club, also known as the Warehouse, are a close knit group of people. Many of these fans communicate through the Warehouse webpage, using chat rooms and message boards. When the band goes on tour, many of the fans travel to distant cities to see the band perform, and they stay at the houses of other Warehouse members. Oftentimes, the only communication with these others has been through the Internet. In my study, I have tried to discover what it is about these online relationships that builds trust between Warehouse members. I have sent out surveys and acquired a test group of about 250 people. At this point in my study, I have concluded that the theory of empathic solidarity is showing in this situation. That is, members share feelings towards a certain other entity, in this case the Dave Matthews Band, so they begin to empathize with each other and build trust. My presentation will be composed of my findings about what builds trust among Warehouse members, and it will draw conclusions about trust building in other similar groups.

The Organization of Petroleum Exporting Countries

NEHA SURIE

CENTENARY COLLEGE OF LOUISIANA
FROST SCHOOL OF BUSINESS

This paper examines the specific influence the Organization of Petroleum Exporting Countries has on international oil markets. My research attempts to explain why and how the prices fluctuate so frequently and significantly. From my research, it appears that the political and economic power struggles influence the international decisions made to stabilize the oil markets. The effects of these

decisions on the economic development of the member countries was investigated and represented with the help of graphical and statistical analysis. The power of the cartel also extends to control the economic development of non-member countries. The effects and extents of this are also investigated. Finally, to understand the importance and dominant role this specific cartel has on global oil markets – its structure, functionality and distribution of power among members are carefully examined. This paper demonstrates the significant role oil has in guiding almost every economy in today's world.

A Cross-Cultural Look at Weak and Strong-institutionally Based Societies: the Difference in the Meaning, Intentions, Usage and Outcome of Group Membership

ARIEJ ABDULHALIM

CENTENARY COLLEGE OF LOUISIANA
DEPARTMENT OF SOCIOLOGY

A country's composition and functioning depends on the types of relationships used to uphold it. Strong-institutionally based societies (SI), usually advanced industrialized countries, primarily value institutionally based relationships, while weak-institutionally based societies (WI), typically traditional and less industrialized, rely more on primary groups. Moreover, the size and function of primary groups differ accordingly. Such structural differences manifest in a variation in day-to-day living, unearthing a difference in priority, need and functioning. Group membership type allocates different routes to achieve prescribed goals. A country that values extended familial kinship, for example, will operate differently than a country that values the nuclear family. The variation of group membership predicates a difference in values. Value systems play a key role in the construction of culture and in turn impact the type of group membership that is most salient. Group memberships are examined, in their historical context, to illustrate the launch of particular value systems and the impression of their outcomes. This paper takes a quantitative, cross-cultural look at group membership's influence on culture using the SI vs. WI model.

Information Fluency at Centenary College

LISA GAME*
BRYAN ALEXANDER, PH.D.

CENTENARY COLLEGE OF LOUISIANA
INFORMATION FLUENCY PROGRAM (ENGLISH/FYE)

Information fluency is becoming increasingly necessary in today's society, where the types of research resources multiply rapidly. Using definitions of information fluency from both the ACS and the Association of Colleges and Research Libraries, Dr. Alexander and I developed an IF project to increase Centenary students' abilities to collect and analyze information. IF can be broken down into information searching, assessment for usefulness, and presentation to an academic audience. Critical thinking, thoughtful usage of technology and making connections between information are all vital aspects of being information fluent.

Because information and technology that helps to obtain it are fluid and constantly changing, we developed materials that were categorical as well as specific. This includes knowing both established and new resources, such as Magale library, Interlibrary Loans, internet searching, and intelligent agents, as well as determining which resource is the best for the research task. By offering a variety of workshops and Web-based materials, we were able to teach students how to find and use information successfully; students taught us how to help them build on their pre-existing research skills.

The Stories that History Tells Us: Louisiana's Nineteenth-Century Afro-Creole Literature

JENNIFER GIPSON

CENTENARY COLLEGE OF LOUISIANA
ANCIENT AND MODERN LANGUAGES, FRENCH

Almost 100 years before the Harlem Renaissance, a rich Afro-Creole literary tradition flourished in Louisiana. In antebellum New Orleans, an educated group of French-speaking "free persons of color" generated a sizable literary corpus. Today, in spite of their tremendous cultural, literary, and historical value, these writings exist mainly on microfilm – many of them still unstudied and untranslated. Therefore, this project focused on locating, transcribing, and translating selected works, especially writings that address racial and political issues.

Due to an 1830 law that provided severe penalties for anyone inciting rebellion among African-Americans, there are few overt mentions of racial issues in antebellum Afro-Creole literature. Often, these references are veiled such as in *L'Album Littéraire*, an 1843 literary journal published by New Orleans' free Afro-Creoles. Materials for this project came from various sources including the 1860s African-American newspaper *L'Union* and its successor, *La Tribune de la Nouvelle-Orléans*, the first black daily in the United States.

This project sought to make selected works and translations available to the public. To this end, *Le Tintamarre*, Centenary's French newspaper, published a bilingual literary edition of Louisiana's Afro-Creole literature. Texts and historical explanations are also posted online (<http://www.centenary.edu/departme/french/anglais/afcreoleanglais.html>).

Exploring Virtual Worlds: Interactive Fiction and the Internet

AMANDA SCHIFFNER

CENTENARY COLLEGE OF LOUISIANA
DEPARTMENT OF ENGLISH

The main goal of my project was to create an original work, a sophisticated narrative told through the most advanced technologies and techniques of interactive multimedia, and to publish the finished work on the internet. This original work consists of a ghost story, written in what might be termed a "choose your own adventure" style. This style of story contains multiple endings, allows the user to direct the flow and action of a story more, and puts the user (or the reader in this case) in the point of view position of the character.

Internet interactivity, the ability to use hyperlinks to jump from one point in virtual space to another, enriches the possibilities of a "choose your own adventure" story. By focusing my attention on the possible uses of the Macromedia program Flash 5.0, I was able to enrich my short story even more. Flash 5.0 is basically an animation program, though if used creatively it can be much more. By using simple images and text animations, I was able to enhance various parts of my story.

By using Flash I was able to enhance, via simple text fades and graphics, the overall atmosphere of the story. I was also able to use Flash to encourage close reading and participation. This was possible because I had more control over what I wanted the links to look like. Overall, I was able to create a fun, and complex work by exploring the possibilities of publishing this sort of short story on the Internet, and using available technology to do so.

Mona Hatoum: Breaking Stereotypes or Good Colonial

STACY SHELTON

CENTENARY COLLEGE OF LOUISIANA
DEPARTMENT OF HUMANITIES

Mona Hatoum – sculptor, installation artist, and performance artist – was born in Beirut to Palestinian parents, but settled permanently in London at the age of 23 after war broke out in Lebanon. Her sculptures, often depicting commonplace utilitarian objects, have recently been thrust into the forefront, and Hatoum has achieved increasing success as both a feminist artist and as a member of the young British artists referred to as the “Brit pack.” However, with exhibition titles such as *Mona Hatoum: The Entire World as a Foreign Land* and critiques by Edward W. Said, author of *Orientalism*, it becomes necessary to examine her work from an Orientalist perspective, analyzing whether her works break typical colonial stereotypes or help propagate them. Also, the reasons behind the success of her works and their accumulation by major art museums, such as the Tate Modern, should be examined: Is she successful because society is finally ready to abolish the notion of “Other” or because Hatoum simply represents a “good” colonial subject?

Afrofuturism: A Look at Race and Cyberspace

CASANDRIA SNIPE

CENTENARY COLLEGE OF LOUISIANA
DEPARTMENT OF ENGLISH

What is Afrofuturism? Afrofuturism is a term first coined by Mark Dery that has since exploded onto the ethnic and minority scene as the word that defines the hopeful and yet harrowing future of a world connected through media and technology and how this “new” future incorporates or segregates minorities, especially African-Americans. This research delves into four major topics: access to the Internet, useful purposes of the Internet, online social societies (segregated and otherwise), and the Westernization of the WORLD Wide Web.

The first topic shall discuss accessibility to the World Wide Web. While more than 70% of the middle class have access to the Internet (mostly through home computers), there is a great number of lower middle class who are too poor to have Internet access *at all*. Many have termed this great separation as the “Digital Divide.” By examining

Census records and worldwide statistics, one can discern what this “divide” will mean for the future of those without access, a great number of them being of African and/or Hispanic origin not to mention third world countries. For those minorities who have crossed this divide, for what purposes are they using the Internet? What percent of professionals, such as graphic design, technicians, or programmers are of African and Hispanic descent or does a greater number use the Internet for entertainment purposes such as shopping and music? The third topic, which I have coined as the “new cybernetic lunch table” discusses the frequent occurrence of ethnic groups to form and hold their own chat rooms and forums. While I see no inherent problem with such groups as African-American Book Clubs or purely feminist chat rooms, what about those that bring different hate groups together? And for those chat rooms whose identities are solely based upon the imaginations of those involved, there seems to be a hidden crossover of stereotypical views that have found their way onto what moguls such as MCI and Microsoft have promised to be a utopian electronical society. Instead, several Internet users have found this to be an illusion as the “whitenizing” and “postcolonialism” that mirrors our own very *real* society seeps its way onto *virtual* society.

Critical Maximum Temperatures for *Pholcus phalangioides* and *Phidippus mystaceus*

JULIE REISIG

CENTENARY COLLEGE OF LOUISIANA
DEPARTMENT OF BIOLOGY

All animals have a thermal tolerance range in which they can survive. The temperature directly above this range is the critical maximum temperature (CT_{max}). I measured the CT_{max} for *Pholcus phalangioides* (cellar spiders) and *Phidippus mystaceus* (jumping spiders). Because *P. phalangioides* are exposed to a fairly controlled climate inside homes, and *P. mystaceus* are found on open ground in southern regions, I predicted that *P. mystaceus* has a higher CT_{max} than *P. phalangioides*.

I used 12 *Pholcus phalangioides* individuals, 6 *Phidippus mystaceus* individuals, and 4 individuals of unidentified species as subjects. I put each spider and a stainless steel temperature probe into a small plastic chamber, which was placed inside a larger tube in a water bath. The spiders were observed as the water temperature was increased. When the spider no longer responded to manual stimulation of the chamber, I recorded the temperature

as the CT_{max} . The average CT_{max} for *P. phalangioides* was 47.08°C and for *P. mystaceus* was 48.27°C. The single factor ANOVA gave a P-value of 0.01, indicating that *P. mystaceus*'s CT_{max} was significantly higher.

An interesting note is that as the temperature neared *P. mystaceus*'s CT_{max} , it became agitated. This flurry of activity was short-lived, but noteworthy.

Anti- and Pro-Inflammatory Cytokine Expression in $CD4^+CD45Rb^{high}$ and $CD4^+CD45Rb^{low}$ SCID Mice

KATHRYN L. FURR*
JASON M. HOFFMAN
F. STEVEN LAROUX
JONI B. DROST, PH.D.
MATTHEW B. GRISHAM

CENTENARY COLLEGE OF LOUISIANA

DEPARTMENT OF BIOLOGY

AND LSU HEALTH SCIENCES CENTER

DEPARTMENT OF MOLECULAR AND CELLULAR PHYSIOLOGY

As an immune response toward invading pathogens, $CD4^+$ T-helper cells initiate an inflammatory response through the up-regulation of a family of proteins known as cytokines. However, this regulation can break down and can cause a dysregulated inflammatory response. An example of this is the chronic inflammation of the intestine and/or colon known as Inflammatory Bowel Disease (IBD). In this experiment, the up-regulation of certain pro-inflammatory and anti-inflammatory cytokines was examined in $CD4^+CD45Rb^{high}$ and $CD4^+CD45Rb^{low}$ severe combined immunodeficient (SCID) mice. The anti-inflammatory cytokines, transforming growth factor beta (TGF- β) and interleukin-10 (IL-10) were up-regulated at higher levels than the pro-inflammatory cytokines in the Rb^{low} mice. The pro-inflammatory cytokines, tumor necrosis factor alpha (TNF- α), interleukin-12 (IL-12), and interferon gamma (IFN- γ) were up-regulated at higher levels in the Rb^{high} mice. TNF- α had a 1.9 fold-increase, IFN- γ had a 5.4 fold-increase, and IL-12 had a 1.25 fold-increase over the Rb^{low} mice. These data would suggest that there is a possible dysregulation of anti-inflammatory cytokines in the Rb^{high} treated SCID mice such that other pro-inflammatory cytokines are capable of perpetuating the immune response. Therefore, we suggest therapies directed against pro-inflammatory cytokines and/or something that can stimulate the anti-inflammatory response.

Fixed points of the ($n,3$)-Josephus Permutations

SARAH BREEDE
CHRISTY FINCH*

CENTENARY COLLEGE OF LOUISIANA
DEPARTMENT OF MATHEMATICS

In this paper, we consider a variation of the classical Josephus Dilemma, which is used often in recursive exercises. In a circle of n men when every third person is eliminated until one remains, the order of elimination defines an $(n,3)$ -Josephus permutation. We discover and prove 15 remarkable patterns in the fixed points of these permutations.

The Feasibility of Near-Infrared Spectroscopy for Transcranially Monitoring Haemodynamic Changes in Rats

DAVON FERRARA*
SHU ZHANG, MD
FENG XIAO, MD
JENNIFER EWING
STEVEN ALEXANDER, PH.D.
JUAN RODRIGUEZ, PH.D.

CENTENARY COLLEGE OF LOUISIANA
DEPARTMENT OF PHYSICS
AND LSU HEALTH SCIENCES CENTER
DEPARTMENTS OF PHYSIOLOGY, EMERGENCY MEDICINE

Little is known about the causes of brain damage due to the return of blood flow to the brain after a prolonged disruption. Research in this area is especially important in the field of emergency medicine because of the high percentage of permanently brain damaged cardiac arrest survivors. Novel optical techniques, such as near-infrared spectroscopy (NIR), may offer a non-invasive method to monitor changes in cerebral blood volume, hemoglobin oxygenation, and cytochrome redox state in real time. We have successfully implemented an NIR technique in a rat model of cardiac arrest and resuscitation under normothermic and hypothermic conditions. Preliminary results show that the technique may offer new insights into the mechanisms behind post-ischemic brain damage, and ultimately lead to therapies to help prevent its occurrence.

RNA Interference of PAL1 in *Drosophila Melanogaster*

STACI DEATON

WASHINGTON UNIVERSITY IN ST. LOUIS
DEPARTMENT OF ANATOMY AND NEUROBIOLOGY

In *Drosophila melanogaster*, PAM is a conserved, multi-functional protein that contains two enzymes that act sequentially to catalyze the amidation of neuroendocrine peptides. The first step of this reaction is catalyzed by PHM, and the second step by PAL (in insects, more than 90% of all neuropeptides must be amidated for functionality). PHM mutants have allowed in-depth study of the gene, but so far attempts to make a PAL mutant have been unsuccessful.

RNA interference is a relatively new technique that can be used to provide mutant phenotypes in a variety of organisms without actually knocking the gene out. In *Drosophila*, double-stranded RNA specific for the gene being studied is injected into the embryo before cellularization occurs. The presence of the RNA silences the gene for as long as the RNA remains in the embryo, though it is still unclear exactly how this process works. Over time, levels of RNA decrease and gene function is restored. It has been hypothesized that a PAL mutant would have similar fate of PHM mutants, death in early development. The purpose of my project was to learn this technique and investigate this mutant condition.

Phosphine-Phosphite Ligands and Hydroformylation

THOMAS LOUIS*
TOM CUNDARI, PH.D.
GREG PETERS, PH.D.

UNIVERSITY OF MEMPHIS
DEPARTMENT OF CHEMISTRY

Hydroformylation is an important industrial process for the synthesis of numerous bulk chemicals and intermediates. The asymmetric hydroformylation reaction has important applications in the pharmaceutical industry and drug synthesis. This research sought to develop new and improved phosphine-phosphite chelating ligands for olefin hydroformylation. The phosphite precursor was synthesized by the reaction of PCl_3 and a biphenyl-diol under an inert atmosphere. This material was then characterized by ^1H and ^{13}C NMR. The phosphine precursor was obtained in similar fashion, and the phosphine-phosphite ligand obtained using a Grignard reaction. This novel ligand was characterized by multi-nuclear NMR spectroscopy. A combination of compu-

tations and experiments suggested interesting electronic and steric properties for this phosphine-phosphite ligand, and future work will focus on its purification.

Two-Dimensional DNA Crystals for Nanoconstruction

AIMEE ROBINSON*

CHRIS RUSSO

PAUL HUBER

CRAIG LENT

UNIVERSITY OF NOTRE DAME
NANOSCALE CHEMISTRY REU PROGRAM

The construction of two-dimensional crystal lattices composed from double-stranded DNA was developed by Winfree (E. Winfree, F. Liu, L. Wenzler, N.C. Seeman, Design and self-assembly of two-dimensional DNA crystals. *Nature* 394, 539-544 (1998). These lattices, composed of individual tiles, self assemble from short sequences of synthetic, single-stranded DNA. Crossover junctions allow one to attach the helices of multiple strands together in a plane. Each tile in a lattice may be made such that it only attaches to one other type of complementary tile. Non-regular arrays can be constructed by exploiting the accuracy of DNA synthesis, the two-dimensionality achieved by crossover junctions, and the ability of tiles to specifically attach. Oligonucleotides were annealed into tiles by slow cooling, and analyzed by autoradiography and gel electrophoresis. The tiles were annealed into lattices and imaged with AFM. Results show promise for DNA complexes in nanoconstruction.

Laser Assisted Methods of Metal Catalyst Production for Carbon Nanostructure Synthesis

RANDY VANDER WAL PH.D

TOM TICICH, PH.D

LEE HALL

LEIF SHERRY*

NASA-GLENN RESEARCH CENTER IN CLEVELAND, OHIO
MICROGRAVITY COMBUSTION BRANCH

Two laser approaches (photolytic and photothermal) were explored for the synthesis of metal catalysts clusters (nanoparticles), from which carbon nanotubes would ultimately be grown. The source of metal atoms for both approaches was gas molecules from the vapor pressure of solid metallocenes. The photolytic experiments used a

Nd:YAG pulsed laser. This light was of a wavelength that the metallocenes would absorb leading directly to liberation of the central metal atom, nucleation, and subsequent deposition. The photothermal experiments utilized a non-absorbed wavelength from a CO₂ Laser. The energy needed for liberation of the metal atom was thermally supplied to the metallocenes through collisions of molecules with the heated substrate mounted in the laser path. The resulting clusters from each method were analyzed using TEM and SEM.

The Synthesis of Epigallocatechin gallate and Analogs of EGCG

BENJAMIN F. PIERCE

BOWLING GREEN STATE UNIVERSITY
DEPARTMENT OF CHEMISTRY

Epigallocatechin gallate (EGCG) is an anti-oxidant that is found in *Camellia sinensis*. EGCG has been proven to be an extremely beneficial compound, as it has many medicinal attributes. Many research projects have shown the vast characteristics that EGCG exhibits. This compound inhibits the effects of the influenza virus in vitro, it is 200 times a more powerful anti-oxidant than vitamin E in attacking free radicals, and it inhibits the initiation, promotion, and progression of carcinogenesis. Although EGCG is a promising medicinal agent, no research team has yet been able to successfully synthesize the compound. My research involves the continuation of a specific organic synthetic route, concocted by Dr. Thomas H. Kinstle, which is currently directed towards the synthesis of appropriately substituted benzyl phenyl acetylenes that can be reduced to cis-alkenes. Generation of the desired acetylenes by metal-catalyzed coupling reactions or by SN₂ displacement reactions was investigated. The completion of this theoretical route leads to the production of EGCG.

A Physiological Comparison of the Oxygen Produced by *Elodea canadensis* and the Oxygen Consumed by *Gambusia affinis*

JASON FOWLER

CENTENARY COLLEGE OF LOUISIANA
DEPARTMENT OF BIOLOGY

Mosquito fish *Gambusia affinis* are small freshwater fish that are used around the world to control the popula-

tion of mosquitoes. They are currently found in much of the South Central United States and Mexico, and often the water in which they live is stagnant. The aquatic vegetation in environment must supply the fish with necessary oxygen for survival. These fish are now being introduced into northern states to help control the mosquito population. In this study, I measured the oxygen consumption of *G. affinis* and the oxygen production of *Elodea canadensis*, a northern plant, in order to determine if the oxygen produced by this northern plant would be enough oxygen on which the southern mosquito fish could live. I also determined whether a change in ambient temperature would play a role in this balance of oxygen production and consumption.

As the ambient temperature increased through the experiment, the amount of O₂/g tissue/hour consumed by the mosquito fish increased while the amount of O₂/g tissue/hour produced by the northern plant decreased. Only at one temperature out of the five tested, 5° C, did *E. canadensis* produce enough oxygen for *G. affinis* to live.

The Effects of Electrical Stimulation and Strength Increase on the Biceps Brachii

BRANT LANDRY

CENTENARY COLLEGE OF LOUISIANA

DEPARTMENT OF BIOLOGY

Electrical stimulation of muscles can be supplied by E-Stim, an electrical device that sends small electrical impulses into the muscle causing it to contract. I tested an E-Stim model advertised on television to determine if it actually worked as well as lifting weights. College-age men were divided into groups that received either E-Stim, performed weight lifting, or served as a control. The E-Stim group received treatment on their biceps brachii two days a week for ten minutes each session. The group that lifted weights performed one exercise (biceps curl) for a total of four sets, twice a week. The control group performed no exercise and received no treatment. Treatment or exercise was performed for a total of four weeks. The group that lifted weights had an average strength increase of 44% while the group that received E-Stim had an average strength increase of 11%.

The Effects of Different Brands of Dog Food on Consumption Rates, Elimination Rates, and Resting Metabolic Rates of *Mus musculus*

JEREMY NORWOOD

CENTENARY COLLEGE OF LOUISIANA

DEPARTMENT OF BIOLOGY

I tested the effects of differently-priced dog foods on food consumption, fecal production, and resting metabolic rate in *Mus musculus*. I recorded the food consumption and fecal production of 15 mice in isolated cages over a 6-day period. I also measured the oxygen consumption and weight of each mouse before and after the 6-day period. The feces were dried for 14 days and then weighed. After correcting for each mouse's weight, I performed single-factor ANOVA tests on the following: food consumption, wet feces, dry feces, oxygen consumption before, oxygen consumption after, and percent dry to wet feces. The mice that ate the least expensive dog food consumed significantly less oxygen than mice that ate other foods, but these values were not significantly different than the control mice that ate rat chow. This suggests that cheap dog food is supplying less energy than other more expensive dog food brands.

Effect of Continuous Noise on the Metabolic Rate and Ion Conductivity of *Rana pipiens*

JEANNE RASBERY

CENTENARY COLLEGE OF LOUISIANA

DEPARTMENT OF BIOLOGY

Amphibian populations are declining worldwide. One possible cause for their decline is changing habitat due to human interference. Frogs use species-specific calls during the breeding season to find mates; therefore they may be sensitive to changes in environmental noise. I tested whether or not changes in noise levels in an environment would result in changes in physiological functioning in frogs. Any physiological change observed may be a possible cause for amphibian declines. Leopard frogs (*Rana pipiens*) were tested in silent and noisy environments for changes in metabolic rate and ion conductance. A paired t-test was performed to determine the significance of changes in metabolic rate and ion conductance in silent and noisy environments. All frogs experienced a statisti-

cally significant decrease in metabolic rate when placed in a noisy environment. No visible trends were observed for changes in ion conductance across the skin of the frogs. The frogs did not eat when placed in a noisy environment, which may have been responsible for the decrease in metabolic rate. These results suggest that the frogs were placed under some kind of stress in the noisy environment. Stress due to environmental noise suggests another possible contributing factor for amphibian declines.

EEG Findings in Women with Premenstrual Syndrome

FRANCES HAGAMAN
MARY JO FITZGERALD
JOHN MCWILLIAMS
MARGARET READ*
ANITA KABLINGER

LSU HEALTH SCIENCES CENTER
DEPARTMENT OF PSYCHIATRY

Background: Changes in the electroencephalogram (EEG) related to the menstrual cycle have been investigated since the 1930s. Authors have found an increase in total power of the alpha range around ovulation (Gautray et al, *Acta Europ Fertil* 1970; 5-13), and acceleration in alpha rhythms during the luteal phase (Creutzfeld et al, *Electroenceph Clin Neurophys* 1976;128:113-129). Premenstrual syndrome (PMS) represents a cluster of symptoms found in many women during the luteal phase of their cycle. We hypothesized that abnormal EEG's would be found in women who experienced severe PMS.

Methods: Eighty-one females between 18 and 40, with regular menstrual cycles, were recruited through newspaper advertisements. All women underwent a psychological interview, completed the lifetime version of the Schedule for Affective Disorders and Schizophrenia (SADS), the Premenstrual Assessment Form (PAF) and had an EEG. Forty-five patients completed assessments and met inclusion criteria.

Results: Subjects were divided into low, medium and high PMS groups based on PAF scores. A high number of subjects demonstrated paroxysmal dysrhythmias (PD) despite the severity of PMS symptoms. Subjects who had PD were compared to those with normal EEG's in terms of specific PMS symptoms. Although this study has limitations, the increased prevalence of EEG abnormalities is intriguing.

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